

# PATENT ABSTRACTS OF JAPAN

(11) Publication number : 2001-277718

(43) Date of publication of application : 10.10.2001

(51) Int.CI. B41M 5/26  
G11B 7/24

(21) Application number : 2000-091824 (71) Applicant : FUJI PHOTO FILM CO LTD

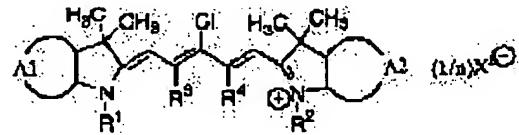
(22) Date of filing : 29.03.2000 (72) Inventor : SAITO NAOKI

## (54) OPTICAL INFORMATION RECORDING MEDIUM USING CYANINE COLORING MATTER COMPOUND AND RECORDING METHOD

### (57) Abstract:

**PROBLEM TO BE SOLVED:** To provide an optical information recording medium having excellent record reproducing characteristics and high light resistance.

**SOLUTION:** In this information recording medium, a recording layer, on which information recording can be executed by laser, is provided on a substrate. In addition, the recording layer includes a cyanine coloring matter compound represented by general formula (I), A1 and A2 represent independently condensed naphthalene rings, R1 and R2 represent independently alkyl groups, R3 and R4 represent independently hydrogen atoms and alkyl groups that may have a substituent, Xn- represents a n-valent organic anion except a naphthalene-1,5-and-1,7-disulfonate ion, n represents an integer of from 1 through 5, R3 and R4 may well form a ring by connecting with each other.



### LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than

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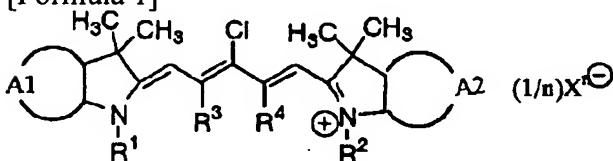
## CLAIMS

## [Claim(s)]

[Claim 1] The information record medium with which it is the information record medium which prepared with laser the record layer in which information record is possible on the substrate, and this record layer is characterized by including the cyanine-dye compound expressed with the following general formula (I).

General formula (I)

## [Formula 1]



A1 and A2 express the naphthalene condensed ring independently respectively among [formula, and R1 and R2 express an alkyl group independently respectively. R3 And R4 The alkyl group which may have the hydrogen atom or the substituent independently respectively is expressed. Xn- the organic anion of n \*\* other than naphthalene -1, 5- and -1, and 7-disulfon acid ion -- expressing -- n -- the integer of 1 or 5 -- expressing -- R3 And R4 It may connect mutually and the ring may be formed.]

[Claim 2] The information record medium according to claim 1 characterized by Xn- being organic sulfonic-acid ion other than naphthalene -1, 5- and -1, and 7-disulfon acid ion.

[Claim 3] The information record medium according to claim 1 characterized by n being 2 or 4.

[Claim 4] The information record medium according to claim 1 characterized by being the naphthalene disulfon acid ion to which Xn- has OH (hydroxyl group) as a substituent.

[Claim 5] The information record medium according to claim 1 characterized by A1 or A2 being the naphthalene ring of 1 and 2 condensed ring.

[Claim 6] An optical information record medium given in the claim 1 or any of 5 they are. [ which a substrate is a transparent disk-like substrate with a thickness of 1.2\*\*0.2mm which has the pre groove of 1.4-1.8 micrometers of track pitches on the front face, and is characterized by preparing the record layer in the near front face in which this pre groove was formed ]

[Claim 7] An optical information record medium given in the claim 1 or any of 6 they are. [ which is characterized by preparing the light reflex layer which consists of a metal further on a record layer ]

[Claim 8] An optical information record medium given in the claim 1 or any of 7 they are. [ which is characterized by preparing the protective layer in the record layer upper part ]

[Claim 9] The record method of the information which irradiates laser with a wavelength of 750-850nm, and records information on an optical information record medium given in any [ a claim 1 or ] of 8 they are.

[Translation done.]

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**DETAILED DESCRIPTION**

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to a coloring matter compound useful to manufacture of the information record medium in which the information writing by laser is possible, and this information record medium.

[0002]

[Description of the Prior Art] The disk type information record medium (optical disk) in which the information record only for 1 time is possible is also called recordable compact disk (the so-called CD-R) by the laser beam, for example, is widely used as memory for computers. The basic structure of CD-R consists of the transparent disk-like substrate (usually products made from polymer, such as a polycarbonate), and the information record layer on it. In addition, usually a reflecting layer and a protective layer are further prepared on this record layer. The design of an information record layer is one of the most important elements which determines the performance of CD-R, therefore various material is examined and it has continued till present. For example, organic coloring matters, such as a metal or semimetals, such as a tellurium and an indium, and poly methine, a phthalocyanine, can be mentioned.

[0003] The writing (record) of the information on an optical disk is performed by usually irradiating the laser of the wavelength near 780nm. As a result of the irradiation portion of a record layer absorbing laser, carrying out a temperature rise locally and producing a physical or chemical change, information is recorded when the optical property of the part changes. It is carried out when reading (reproduction) of information, on the other hand, also usually irradiates the laser for record, and the laser of the same wavelength. Although information is reproduced by discriminating the portion from which the optical property of a record layer changed, and the portion which is not changing, it is most common to the discernment that the difference of a reflection factor is used.

[0004] since it can form easily by differing in the case of a metal, distributing or dissolving and applying to the organic solvent the record layer which consists of an organic coloring matter, it is advantageous in respect of a manufacturing cost, and is high sensitivity further as compared with a metal record layer -- etc. -- it has an advantage Especially, since a cyanine-dye compound has the outstanding sensitivity and the outstanding reflection factor, it is widely used as a coloring matter compound for CD-R. However, as for a cyanine-dye compound, it is common for there to be a problem of a low in the stability over light generally, and to add and use a tenebrescence inhibitor so. However, although sufficient lightfastness is given, if the tenebrescence inhibitor of a complement is added, the problem that a recording characteristic gets worse will arise. Therefore, although development of the cyanine dye which was more excellent in lightfastness has been desired strongly, the present condition is that the organic record layer which has the lightfastness which should still be satisfied fully is not developed.

[0005] Moreover, although the request to the record medium which can be equal to high-speed reading (or writing) is becoming still stronger with improvement in the speed of data processing of a computer, and the increase of the amount of data to deal with, it is necessary to design the record layer which

excelled [ attain / this ] in the recording characteristic more. Although the registration number No. 2966855 official report, JP,5-325251,A public relations, JP,10-81068,A, and a cyanine-dye compound given in JP,10-226170,A offer the record layer excellent in record reproducing characteristics, improvement that it is not yet enough and still much more is desired.

[0006]

[Problem(s) to be Solved by the Invention] The purpose of this invention is offering the information record medium which has the high stability (especially lightfastness) which has the outstanding recording characteristic and can maintain the recording characteristic enough over a long period of time.

[0007]

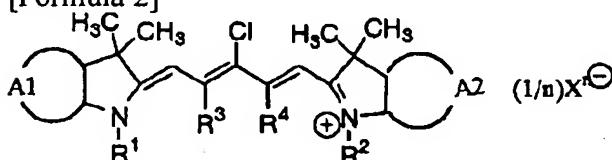
[Means for Solving the Problem] By examining the conventional substituent and its conventional opposite salt of a cyanine-dye compound, this invention person found out that the information record medium further improved in a recording characteristic and preservation stability compared with the former could be manufactured.

[0008] The purpose of this invention was attained by the following modes.

(1) The information record medium with which it is the information record medium which prepared with laser the record layer in which information record is possible on the substrate, and this record layer is characterized by including the cyanine-dye compound expressed with the following general formula (I) : general formula (I)

[0009]

[Formula 2]



[0010] A1 and A2 express the naphthalene condensed ring independently respectively among [formula, and R1 and R2 express an alkyl group independently respectively. R3 And R4 The alkyl group which may have the hydrogen atom or the substituent independently respectively is expressed. Xn- the organic anion of n \*\* other than naphthalene -1, 5- and -1, and 7-disulfon acid ion -- expressing -- n -- the integer of 1 or 5 -- expressing -- R3 And R4 It may connect mutually and the ring may be formed. ]

[0011] (2) Xn - naphthalene - one -- five - and - one -- seven - disulfon -- an acid -- ion -- except -- organic -- a sulfonic acid -- ion -- it is -- things -- the feature -- \*\* -- carrying out -- ( -- one -- ) -- a publication -- information -- a record medium .

(3) The information record medium given in (1) characterized by n being 2 or 4.

(4) The information record medium given in (1) characterized by being the naphthalene disulfon acid ion to which Xn- has OH (hydroxyl group) as a substituent.

(5) A -- one -- or -- A -- two -- one -- two -- a condensed ring -- naphthalene -- a ring -- it is -- things -- the feature -- \*\* -- carrying out -- ( -- one -- ) -- a publication -- information -- a record medium .

(6) An optical information record medium given in any of (1) or (5) which a substrate is a transparent disk-like substrate with a thickness of 1.2\*\*0.2mm which has the pre groove of 1.4-1.8 micrometers of track pitches on the front face, and are characterized by preparing the record layer in the near front face in which this pre groove was formed they are.

(7) An optical information record medium given in any of (1) or (6) which are characterized by preparing the light reflex layer which consists of a metal further on a record layer they are.

(8) An optical information record medium given in any of (1) or (7) which are characterized by preparing the protective layer in the record layer upper part they are.

(9) The record method of the information which irradiates laser with a wavelength of 750-850nm, and records information on an optical information record medium given in any of (1) or (8) they are.

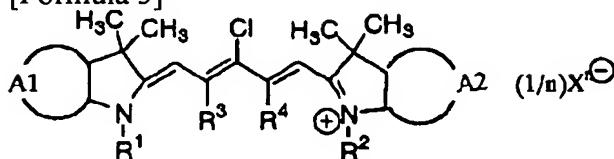
[0012]

[Embodiments of the Invention] The information record medium of this invention is characterized by a

record layer containing the cyanine-dye compound expressed with the following general formula (I).  
 General formula (I)

[0013]

[Formula 3]



[0014] A1 and A2 express the naphthalene condensed ring independently respectively among [formula, and R1 and R2 express an alkyl group independently respectively. R3 And R4 The alkyl group which may have the hydrogen atom or the substituent independently respectively is expressed. Xn- the organic anion of n \*\* other than naphthalene -1, 5- and -1, and 7-disulfon acid ion -- expressing -- n -- the integer of 1 or 5 -- expressing -- R3 And R4 It may connect mutually and the ring may be formed. ]

[0015] The cyanine-dye compound used for the record medium of this invention below is explained in detail. In a general formula (I), although the naphthalene condensed ring expressed with A1 and A2 may be condensed in which [ of the 1 or 2nd place or the 2 or 3rd place ] position, its case where it has condensed especially in the 1 or 2nd place is desirable.

[0016] It sets to a general formula (I) and is R1, R2, and R3. And R4 It is the alkyl group of carbon numbers 1-18, what that is expressed is desirable as an alkyl group has the still more desirable alkyl group of carbon numbers 1-4, and especially its a methyl group is desirable.

[0017] It sets to a general formula (I) and is R3. And R4 It may connect mutually and the ring may be formed, the ring number has 5 or desirable 7 members, further 5 or its 6 members are desirable, and especially its 6 members are desirable. It sets to a general formula (I) and is R3. And R4 Although a hydrogen atom or an alkyl group is expressed, especially a hydrogen atom is desirable.

[0018] It sets to a general formula (I) and is A1, A2, R1, R2, and R3. And R4 You may have the substituent and the thing of a publication can be listed to below as an example of a substituent. the shape of a chain of the carbon atomic numbers 1-20, and an annular alkyl group (for example, a methyl --) The aryl group which is not replaced [ the substitution of ethyl, n-propyl, an isopropyl, n-butyl, and the carbon atomic numbers 6-18, or ] for example, a phenyl, chlorophenyl, anisyl, toluyl one, 2, and a 4-G t-amyl -- 1-naphthyl, an alkenyl machine (for example, a vinyl, 2-methyl vinyl), An alkynyl group (for example, an ethynyl, 2-methyl ethynyl, 2-phenyl ethynyl), A halogen atom (for example, F, Cl, Br, I), a cyano group, a hydroxyl, a carboxyl group and an acyl group (for example, an acetyl, a benzoyl, and a SARICHI roil --) Pivaloyl, an alkoxy group (for example, a methoxy, butoxy one, cyclohexyloxy), An aryloxy group (for example, a phenoxy, 1-naphthoxy), an alkyl thio machine For example, (a methylthio, a butyl thio, a benzyl thio, 3-methoxy propyl thio), An aryl thio machine (for example, phenylthio, 4-chloro phenylthio), An alkyl sulfonyl machine (for example, a methane sulfonyl, a butane sulfonyl), An aryl sulfonyl machine (for example, benzenesulphonyl, a PARATORU en sulfonyl), The carbamoyl group of the carbon atomic numbers 1-10, the amide group of the carbon atomic numbers 1-10, The imido basis of the carbon atomic numbers 2-12, the acyloxy machine of the carbon atomic numbers 2-10, The alkoxy carbonyl group of the carbon atomic numbers 2-10, a heterocycle machine (For example, aliphatic heterocycles, such as aromatic heterocycles, such as pyridyl, a thienyl, a furil, thiazolyl, imidazolyl, and pyrazolyl, a pyrrolidine ring, a piperidine ring, a morpholine ring, a pyran ring, a thiopyran ring, a dioxane ring, and a dithiolane ring).

[0019] As the above-mentioned substituent, the carbon atomic number 1 or the alkyl group (especially methyl) of 6, the carbon atomic number 6 or the aryl group (especially phenyl) of 10, the carbon atomic number 1 or the alkoxy group (especially methoxy) of 10, a hydroxyl, and a halogen atom (especially chlorine atom) are a methyl group, a phenyl group, a hydroxyl, and a chlorine atom desirable especially preferably.

[0020] In a general formula (I), although Xn- shows organic anions other than naphthalene -1, 5- and -1,

and 7-disulfon acid ion as the concrete example -- carboxylic-acid ion (for example, acetic-acid ion --) Trifluoroacetic-acid ion, benzoic-acid ion, succinic-acid ion, maleic-acid ion, Fumaric-acid ion, terephthalic-acid ion, sulfonic-acid ion for example, methansulfonic acid ion and trifluoromethane sulfonic-acid ion -- Butane -1, 4-disulfon acid ion, a cyclohexane -1, 4-disulfon acid ion, Benzene -1, 3-disulfon acid ion, 3, and 3'-biphenyl disulfon acid ion, Naphthalene -1, 6-disulfon acid ion, naphthalene -2, 6-disulfon acid ion, The 1-methylnaphthalene -2, 6-disulfon acid ion, naphthalene -2, 7-disulfon acid ion, Naphthalene -2, 6-disulfon acid ion, the 1-naphthol -3, 6-disulfon acid ion, 2-naphthol -3, 6-disulfon acid ion, 2, and 7-dihydroxy -3 and 6-disulfon acid ion, 2-naphthol -6, 8-disulfon acid ion, 1, 8-dihydroxy naphthalene -3, 6-disulfon acid ion, 1, 5-dihydroxy naphthalene -2, 6-disulfon acid ion, naphthalene -1, 3, 5-tris RUHON acid ion, Naphthalene -1, 3, 6-tris RUHON acid ion, naphthalene -1, 3, 7-tris RUHON acid ion, 1-naphthol -3, 6, 8-tris RUHON acid ion, 2-naphthol -3, 6, 8-tris RUHON acid ion, Naphthalene -1, 3, 5, 7-tetrapod sulfonic-acid ion, the poly sulfuric monoester (an example, a propylene glycol -1, 2-JISURUFETO, polyvinyl alcohol poly sulfate ion), etc. are mentioned.

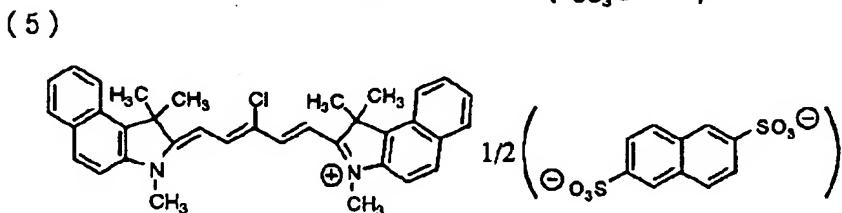
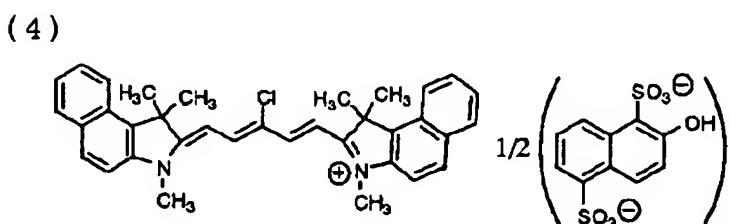
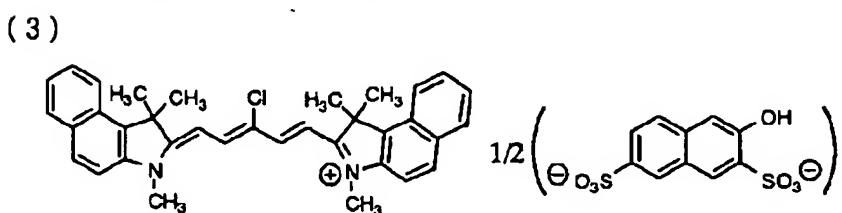
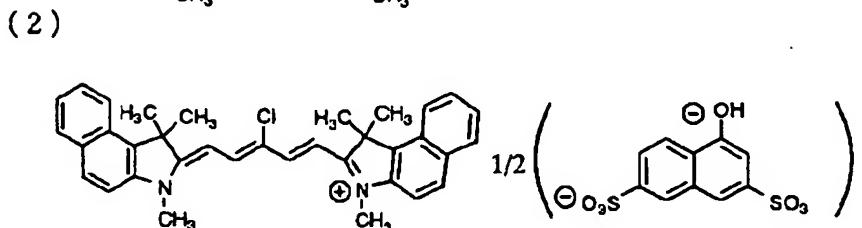
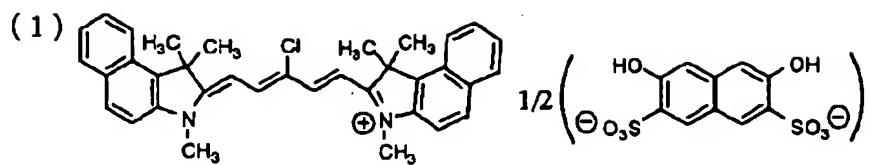
[0021] In this invention, it is 2 or 4 that it is 1 or tetravalence desirable still more preferably, and, as for n, especially 2 is desirable. Moreover, as an organic anion expressed with  $X_n^-$ , organic carboxylic-acid ion or organic sulfonic-acid ion is desirable, and especially organic sulfonic-acid ion is desirable. Also in organic sulfonic-acid ion, the naphthalene disulfon acid ion which has a substituent is desirable, the naphthalene disulfon acid ion which have a hydroxyl group as a substituent further is desirable, and 2, 7-dihydroxy -3, and 6-disulfon acid ion are especially desirable.

[0022] By joining together in arbitrary positions and the compound expressed with a general formula (I) forming the polymer, even if each unit in this case is mutually the same, it may differ, and you may combine with polymer chains, such as polystyrene, a polymethacrylate, polyvinyl alcohol, and a cellulose.

[0023] Although the example of a cyanine-dye compound expressed with the general formula (I) used for this invention is given to a degree, this invention is not limited to these.

[0024]

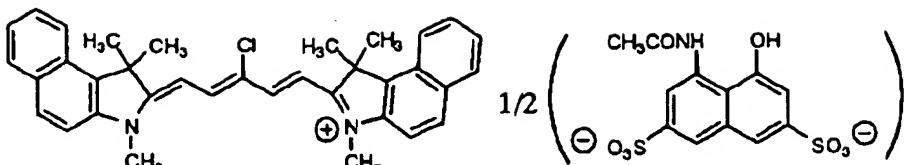
[Formula 4]



[0025]

[Formula 5]

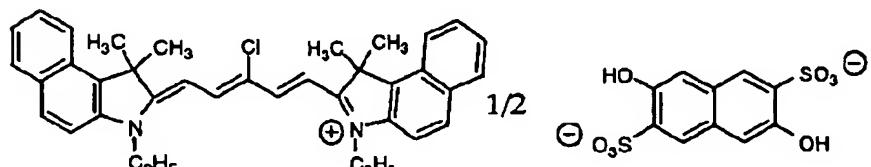
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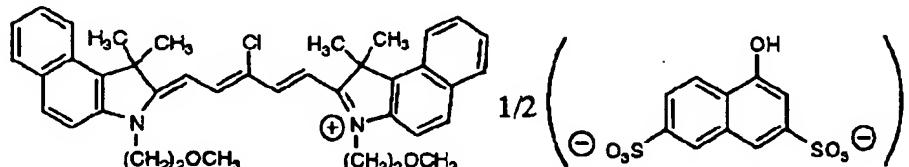
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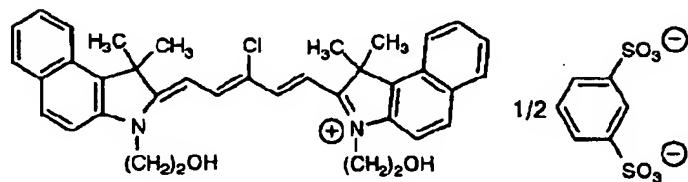
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[0026]

[Formula 6]

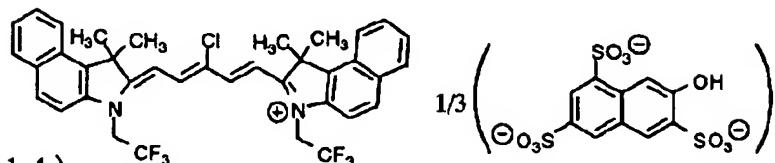
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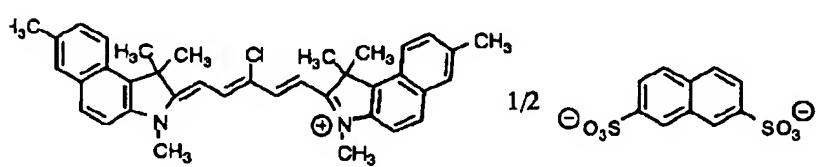
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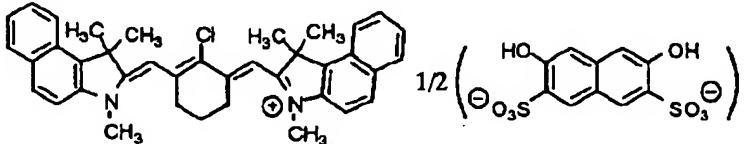
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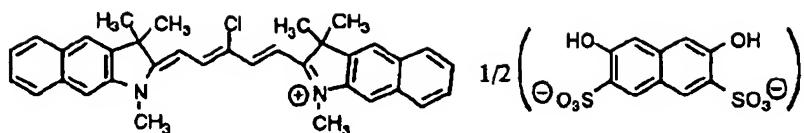
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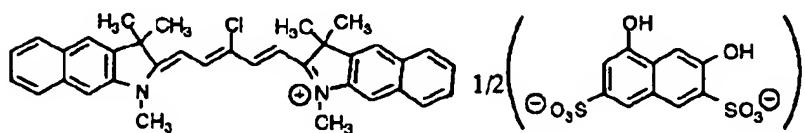
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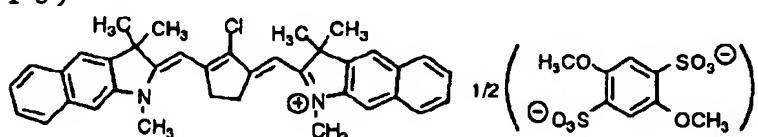
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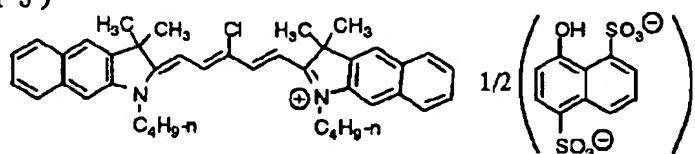
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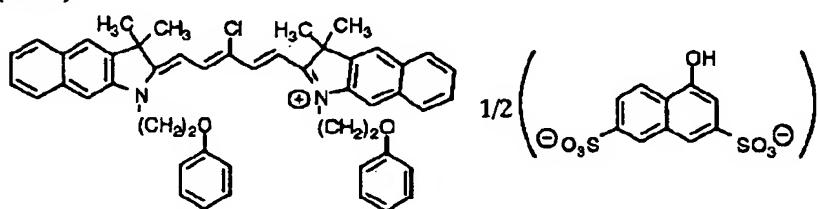
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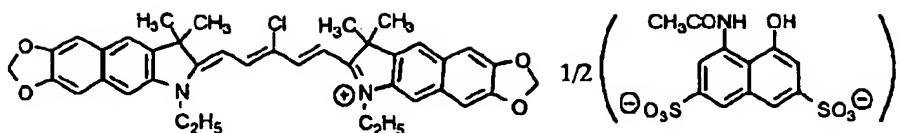
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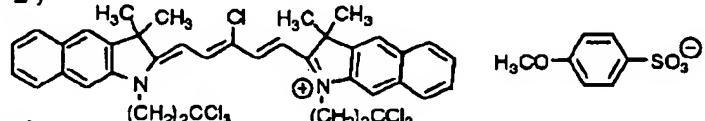
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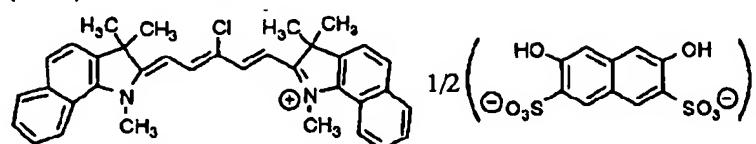
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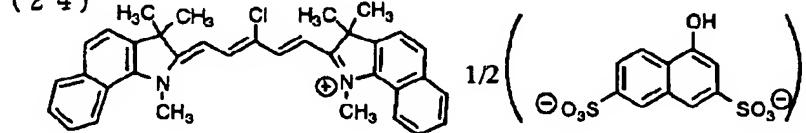
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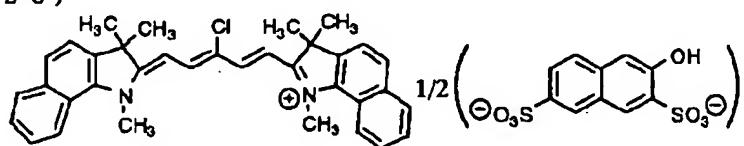
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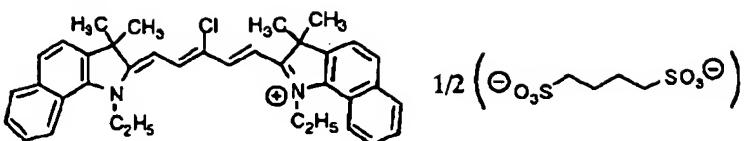
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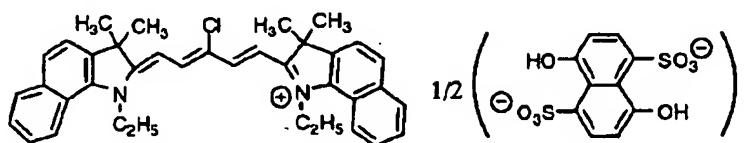
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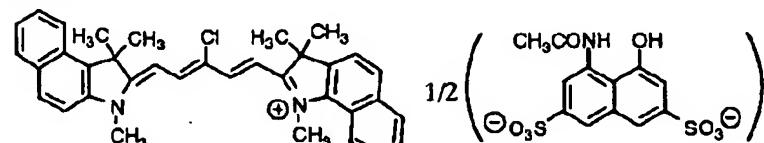
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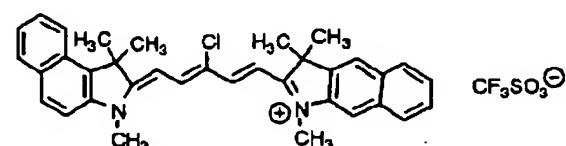
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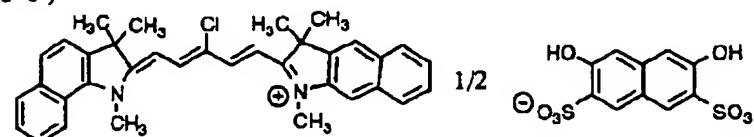
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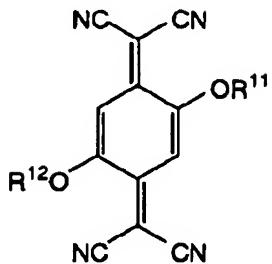
[0030] The coloring matter of this invention F.M Harmer (F. M.Harmer) work "hetero cyclic party UNZU-cyanine soybean - and - RIREITIDO party UNZU () [ Heterocyclic Compounds-Cyanine Dyes ] and Related Compounds [ ]" and John Willie - and - Suns (John Wiley & Sons)-New York, London, 1964 annual publications, Day em SUTAMA (D. M.Sturmer) work "-- hetero cyclic party UNZU - special TOPICS in hetero cyclic chemistry (Heterocyclic Compounds-Special topics in heterocyclic chemistry)" -- Chapter 18, Section 14, the 482nd to 515 term, John Willie -, and - Suns (John Wiley & Sons) Shrine-New York, London, 1977 annual publications, "ROZZU chemistry OBU carbon party UNZU (Rodd's Chemistry of Carbon Compounds)" 2nd.Ed.vol.IV, partB, 1977 \*\*, Chapter 15, the 369th to 422 term, ERUSEBIA science public company ink (Elsevier Science Publishing Company Inc.) company \*\*, Based on the method given in reference quoted by a method or this official report New York and given in JP,10-226170,A, it is compoundable.

[0031] The optical information record medium of this invention has on a substrate a record layer containing the coloring matter compound expressed with the general formula (I) mentioned above. The coloring matter compound concerning this invention can be advantageously used in CD-R as an optical information record medium.

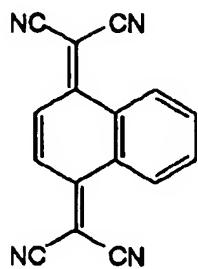
[0032] As for a record layer, it is desirable to contain various tenebrescence inhibitors in order to raise the lightfastness of a record layer further. An organic oxidizer and a singlet-oxygen quencher can be mentioned as a tenebrescence inhibitor. As an organic oxidizer used as a tenebrescence inhibitor, the compound indicated by JP,10-151861,A is desirable, and the compound expressed with the following general formula (B1) or (B-2) especially is desirable.

[0033]

[Formula 10]  
一般式 (B 1)



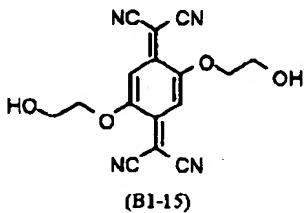
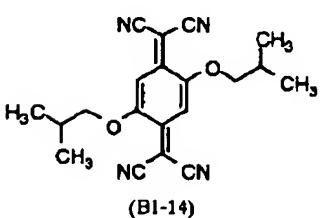
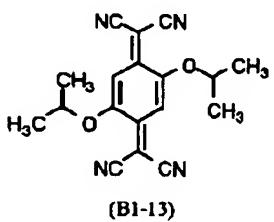
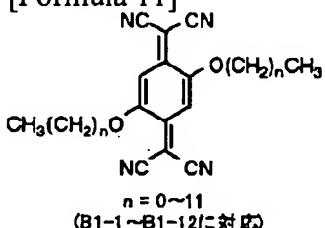
一般式 (B 2)



[0034] In a general formula (B1) and (B-2), although R11 and R12 express a hydrocarbon group independently, respectively A thing desirable as R11 and R12 The alkyl group of carbon numbers 1-18, They are the alkenyl machine of carbon numbers 2-18, the alkynyl group of carbon numbers 2-18, and the aryl group of carbon numbers 6-14. You may have the substituent, it sets to a general formula (II) as an example of these substituents, and these hydrocarbon groups are R1. And R2 It is the same as that of what was mentioned as a substituent. The desirable example of a compound expressed with a general formula (B1) is shown below.

[0035]

[Formula 11]

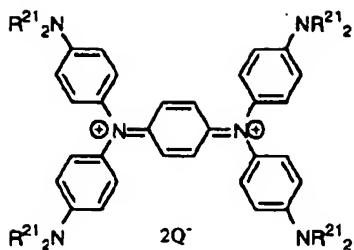


[0036] The compound expressed with the general formula (B1) concerning this invention and (B-2) may be used independently, and may use two or more sorts together. In addition, the compound expressed with the general formula (B1) concerning this invention and (B-2) is easily compoundable by the method given in JP,10-151861,A.

[0037] As a singlet-oxygen quencher, the thing of a publication can already be used for publications, such as a well-known patent specification. As the example, JP,58-175693,A, 59-81194, 60-18387, 60-19586, 60-19587, 60-35054, 60-36190, 60-36191, 60-44554, 60-44555, 60-44389, 60-44390, 60-54892, 60-47069, the number for each official report [, such as 63-209995, JP,4-25492,A, JP,1-38680,B, and 6-26028 ], German JP,350399,B specification, and Japanization study society magazine October, 1992 -- the thing of a publication can be mentioned to the 1141st page etc. The compound expressed with the following general formula (II) as an example of a desirable singlet-oxygen quencher can be mentioned. General formula (II)

[0038]

[Formula 12]



[0039] [, however R21 express the alkyl group which may have the substituent, and Q- expresses an anion.]

[0040] In a general formula (II), R21 has the common alkyl group of the carbon numbers 1-8 which may be replaced, and its alkyl group of the non-replaced carbon numbers 1-6 is desirable. As a substituent of an alkyl group, a halogen atom (an example, F, Cl), an alkoxy group (an example, a methoxy, ethoxy), an alkyl thio machine (an example, a methylthio, ethyl thio), an acyl group (an example, an acetyl, propionyl), an acyloxy machine (an example, acetoxy, propionyloxy), a hydroxy group, an alkoxy carbonyl group (an example, a methoxycarbonyl, ethoxycarbonyl), an alkenyl machine (an example, vinyl), and an aryl group (In these, a halogen atom, an alkoxy group, an alkyl thio machine, and an alkoxy carbonyl group are desirable. As an example of the anion of Q-, ClO<sub>4</sub><sup>-</sup>, AsF<sub>6</sub><sup>-</sup>, BF<sub>4</sub><sup>-</sup>, and SbF<sub>6</sub><sup>-</sup> are desirable. The example of a compound expressed with a general formula (II) is indicated to Table 1.

[0041]

[Table 1]

表 1

化合物番号	R <sup>21</sup>	Q <sup>-</sup>
II-1	CH <sub>3</sub>	ClO <sub>4</sub> <sup>-</sup>
II-2	C <sub>2</sub> H <sub>5</sub>	ClO <sub>4</sub> <sup>-</sup>
II-3	n-C <sub>3</sub> H <sub>7</sub>	ClO <sub>4</sub> <sup>-</sup>
II-4	n-C <sub>4</sub> H <sub>9</sub>	ClO <sub>4</sub> <sup>-</sup>
II-5	n-C <sub>5</sub> H <sub>11</sub>	ClO <sub>4</sub> <sup>-</sup>
II-6	n-C <sub>6</sub> H <sub>13</sub>	SbF <sub>6</sub> <sup>-</sup>
II-7	n-C <sub>7</sub> H <sub>15</sub>	BF <sub>4</sub> <sup>-</sup>
II-8	n-C <sub>8</sub> H <sub>17</sub>	AsF <sub>6</sub> <sup>-</sup>

[0042] As for the optical information record medium of this invention, it is desirable that it is the composition of having a record layer, a light reflex layer, and a protective layer at this order on a transparent disk-like substrate with a thickness of 1.2\*\*0.2mm which has the pre groove of 1.4-1.8 micrometers of track pitches.

[0043] The optical information record medium of this invention can be manufactured by method which is described below. The substrate of an optical information record medium can be chosen as arbitration from various kinds of material used as a substrate of the conventional optical information record medium. As a substrate material, a vinyl chloride system resin; epoxy resin; amorphous polyolefine,

polyester, etc., such as acrylic resin; polyvinyl chlorides, such as a glass; polycarbonate; polymethylmethacrylate, and a vinyl chloride copolymer, can be mentioned, for example, and they may be used together by request. In addition, such material can be used as a substrate which has rigidity as the shape of a film. In the above-mentioned material, points, such as moisture resistance, dimensional stability, and a price, to a polycarbonate is desirable.

[0044] Undercoat may be prepared in the near substrate front face in which a record layer is prepared for an improvement of smoothness, the improvement in adhesive strength, and the purpose of protection of a record layer. As a material of undercoat, for example, a polymethylmethacrylate, an acrylic acid and a methacrylic-acid copolymer, A styrene maleic anhydride copolymer, polyvinyl alcohol, N-methylol acrylamide, A styrene vinyltoluene copolymer, crawl sulfonation polyethylene, A nitrocellulose, a polyvinyl chloride, a chlorination polyolefine, polyester, Surface-treatment agents, such as polymeric-materials [, such as a polyimide, vinyl acetate and a vinyl chloride copolymer an ethylene vinylacetate copolymer, polyethylene, polypropylene, and a polycarbonate, ]; and a silane coupling agent, can be mentioned. Undercoat can be formed by applying this application liquid to a substrate front face by the applying methods, such as a spin coat, a DIP coat, and an extrusion coat, after dissolving or distributing the above-mentioned matter to a suitable solvent and preparing application liquid. Generally the thickness of undercoat is in the range of 0.005-20 micrometers, and the range of it is 0.01-10 micrometers preferably.

[0045] On the substrate (or undercoat), the irregularity (pre groove) which usually expresses information, such as a slot for tracking or an address signal, is formed. As for this pre groove, it is desirable to form resin material, such as a polycarbonate, on a direct substrate, injection molding or in case extrusion molding is carried out. As for a pre groove, in a CD-R type, it is usually desirable to be formed by the track pitch with a width of face of 1.4-1.8 micrometers.

[0046] As for the depth of a pre groove, it is desirable that it is in the range of 30-200nm, and, as for the half-value width, it is desirable that it is in the range of 0.2-0.9 micrometers. Moreover, sensitivity can be raised without reducing most reflection factors by making the depth of a pre groove into the range of 150-200nm, and it becomes advantageous to manufacture of an optical CD-R type information record medium especially.

[0047] Formation of a record layer can be performed by drying, after dissolving a quencher, a binder, etc. in a solvent by request further, preparing application liquid, applying this application liquid subsequently to a substrate front face and forming a paint film, the aforementioned cyanine-dye compound and. As a solvent of pigment layer application liquid, ester; methyl ethyl ketones, such as butyl acetate and a cellosolve acetate, Ketones, such as a cyclohexanone and a methyl isobutyl ketone; Dichloromethane, Hydrocarbons [, such as a chlorinated-hydrocarbon; dimethylformamide /, such as an amide; cyclohexane ], such as 1, 2-dichloroethane; and chloroform; A tetrahydrofuran, The ether, such as ethyl ether and a dioxane; Ethanol, n-propanol, Fluorine system solvents, such as alcoholic;2, such as an isopropanol and n-butanol diacetone alcohol, 2 and 3, and 3-tetrapod FURORO propanol; An ethylene glycol monomethyl ether, Glycol ethers, such as ethylene glycol monoethyl ether and a propylene glycol monomethyl ether, can be mentioned. the above-mentioned solvent is independent in consideration of the solubility of the coloring matter to be used -- or two or more sorts can be used together and it can use suitably In application liquid, you may add [ for the purpose of various kinds of additives, such as an antioxidant, UV absorbent, a plasticizer and lubricant ] further.

[0048] When using a binder, as an example of a binder For example, natural organic polymeric-material; and polyethylene, such as gelatin, a cellulosic, a dextran, rosin, and rubber, Hydrocarbon system resins, such as polypropylene, polystyrene, and a polyisobutylene, Vinyl system resins, such as a polyvinyl chloride, a polyvinylidene chloride, and a polyvinyl chloride polyvinyl acetate copolymer, Acrylic resin, such as a polymethylacrylate and a polymethyl methacrylate, Synthetic organic macromolecules, such as an initial condensate of thermosetting resin, such as polyvinyl alcohol, a chlorinated polyethylene, an epoxy resin, a butyral resin, a rubber derivative, and phenol-formaldehyde resin, can be mentioned. When using a binder together as a material of a record layer, generally the amount of the binder used is in the range of an amount (mass ratio) an amount - 50 times 0.01 times to coloring matter, and is in the

range of an amount (mass ratio) an amount - 5 times 0.1 times preferably. Thus, generally the coloring matter concentration of the application liquid prepared is in the range of 0.01 - 10 mass %, and is in the range of 0.1 - 5 mass % preferably.

[0049] As the method of application, a spray method, the spin coat method, the dipping method, the roll coat method, the blade coat method, the doctor-roll method, screen printing, etc. can be mentioned. A monolayer or multistory are sufficient as a record layer. Generally the thickness of a record layer is in the range of 20-500nm, and is in the range of 50-300nm preferably.

[0050] On a record layer, a light reflex layer is prepared for the purpose of improvement in the reflection factor at the time of informational reproduction. The light reflex nature matter which is the material of a light reflex layer is matter with the high reflection factor to laser. as the example Mg, Se, Y, Ti, Zr, Hf, V, Nb, Ta, Cr, Mo, A metal and a semimetal, or stainless steel, such as W, Mn, Re, Fe, Co, nickel, Ru, Rh, Pd, Ir, Pt, Cu, Ag, Au, Zn, Cd, aluminum, Ga, In, Si, germanium, Te, Pb, Po, Sn, and Bi, can be mentioned. It is Cr, nickel, Pt, Cu, Ag, Au, aluminum, and stainless steel, and things desirable [ among these ] are Ag and Au still more preferably, and especially its Ag is desirable. These matter may be used independently, or is two or more sorts of combination, or may be used as an alloy. A light reflex layer can form for example, the above-mentioned light reflex nature matter on a record layer vacuum evaporationo, sputtering, or by carrying out ion plating. Generally, the thickness of a light reflex layer is in the range of 10-300nm, and its range of 50-200nm is desirable.

[0051] On a light reflex layer, a protective layer is prepared in order to protect a record layer etc. physically and chemically. as the example of the material used for a protective layer -- SiO, SiO<sub>2</sub>, MgF<sub>2</sub>, SnO<sub>2</sub>, and Si<sub>3</sub>N<sub>4</sub> etc. -- organic substances, such as a mineral matter, thermoplastics, thermosetting resin, and UV hardenability resin, can be mentioned A protective layer can be formed by laminating the film obtained with the extrusion of plastics on a reflecting layer through adhesives. Or it may be prepared by methods, such as vacuum deposition, sputtering, and an application. Moreover, in the case of thermoplastics and thermosetting resin, after dissolving these in a suitable solvent and preparing application liquid, this application liquid can be applied and it can form also by drying. After dissolving in a solvent remaining as it is or suitable in the case of UV hardenability resin and preparing application liquid, this application liquid can be applied, and it can form also by irradiating UV light and stiffening it. In these application liquid, you may add [ for the purpose of various additives, such as an antistatic agent, an antioxidant, and UV absorbent, ] further. Generally the thickness of a protective layer is in the range of 0.1-100 micrometers. According to the above process, the layered product by which the record layer, the light reflex layer, and the protective layer were prepared on the substrate can be manufactured.

[0052] The optical information record method of this invention is performed as follows, using the above-mentioned optical information record medium. First, the light for record of semiconductor laser etc. is irradiated from a substrate side, rotating an optical information record medium with a constant linear velocity (in CD format, it is 1.2-14m/second), or a constant angular velocity. It is thought that a cavity is formed in the interface of a record layer and a reflecting layer (formation of a cavity is formed with deformation of a record layer or a reflecting layer or deformation of both layers), or a substrate carries out padding deformation by irradiation of this light, or information is recorded when a refractive index changes with change of discoloration and a meeting state etc. to a record layer. Generally as a record light, the range of 750-850nm and the semiconductor laser which has the oscillation wavelength of the range of 770-790nm more preferably are used. Reproduction of the information recorded as mentioned above irradiates semiconductor laser from a substrate side, rotating an optical information record medium with the same constant linear velocity as the above, and can be performed by detecting the reflected light.

[0053]

[Example] Next, although an example explains this invention still in detail, this invention is not limited to the following examples.

The tenebrescence inhibitor (B1-1) of 10 mass % of a [example 1] cyanine-dye compound (1) and this cyanine-dye compound was dissolved in 2, 2, 3, and 3-tetrafluoro propanol, and the application liquid

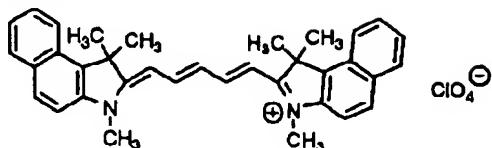
for record stratification was obtained. The coloring matter concentration in the obtained application liquid was 1.5 mass %. This application liquid was applied to the front face by the side of the pre groove of the polycarbonate substrate (diameter : 120mm, thickness : 1.2mm) by which the spiral-like pre groove (track pitch : 1.6 micrometers, groove width of face : 0.4 micrometers, the depth of a groove : 0.17 micrometers) was formed in the front face with injection molding by the spin coat method, and the record layer (thickness (inside of a pre groove) : about 200nm) was formed.

[0054] Next, on the record layer, the spatter of the silver was carried out and the light reflex layer with a thickness of about 100nm was formed. Furthermore, UV hardenability resin (SD318, Dainippon Ink & Chemicals, Inc. make) was applied on the light reflex layer, ultraviolet rays are irradiated, and were stiffened, and the protective layer of 7 micrometers of thickness was formed. The optical disk which follows this invention according to the above process was obtained. what (the amount used has no change respectively) was changed into the compound which shows a cyanine-dye compound (1) and a tenebrescence inhibitor (B1-1) in Table 2 in the example 1 -- except manufactured the optical disk according to this invention similarly moreover, coloring matter compound A-H for comparison (the amount used has no change) which shows a cyanine-dye compound (1) below in an example 1 -- moreover, the optical disk for comparison was similarly manufactured except having changed into the compound which shows a tenebrescence inhibitor (B1-1) in Table 2

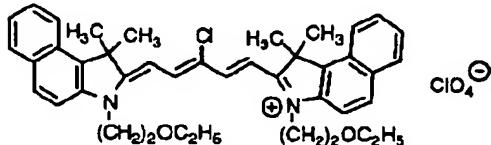
[0055]

[Formula 13]

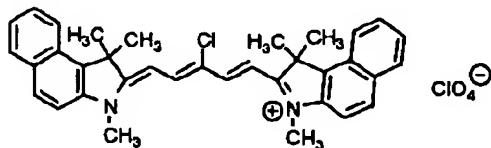
比較用色素化合物 A



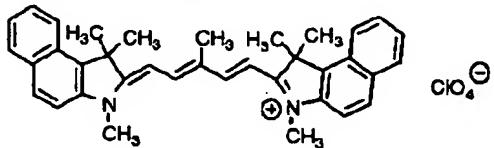
比較用色素化合物 B : 特登第2966855号記載の具体例 (II-3)



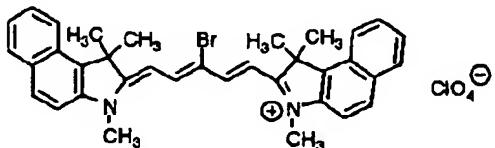
比較用色素化合物 C : 特開平5-325252号請求の範囲の化合物



比較用色素化合物 D : 特登第2827005号記載の具体例 (II-3)



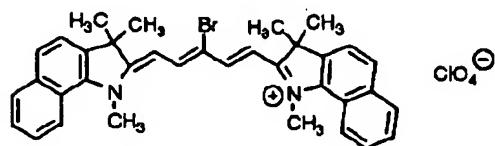
比較用色素化合物 E : 特開平10-6653号記載の具体例 (I-1)



[0056]

[Formula 14]

## 比較化合物F：特開平10-6653号記載の具体例（I-43）



## 比較化合物G：特開平10-226170号記載の具体例6



## 比較化合物H：特開平10-235999号記載の具体例（I-31）



[0057] Semiconductor laser with a wavelength of 780nm was irradiated, the record laser power was variously changed into the sample of the [evaluation of record medium] (1) modulation-factor examples 1-15, and the examples 1-8 of comparison in 4-9mW with a constant linear velocity of 1.4m/second, carrying out the tracking of the pre group, and the EFM signal of 3T and 11T was recorded on it. It reproduced by laser-power 0.5mW, and asked for the modulation factor of 3T and 11T in the optimal record power (sensitivity).

[0058] (2) The sample recorded as mentioned above light-fast was attained to for 48 hours, Xe lamp (170,000 luxs) was irradiated for 120 hours at it, and the modulation factor after irradiation was measured like the above. Moreover, the existence of the color of the sample after irradiation was observed visually, and it was ranked as each following level.

AA: Tenebrescence has not been carried out.

BB: It is tolerance although tenebrescence is carried out a little.

CC: Tenebrescence is carried out clearly.

DD: A color hardly remains.

The obtained evaluation result is shown in three tables.

[0059]

[Table 2]

表2

シアン 色素化合物	褪色 防止剤	変調度 (%)			耐光性	
		3 T	11 T	48 hr	120 hr	
実施例 1 (1)	(B1-1)	45	77	AA	AA	
実施例 2 (2)	(B1-2)	44	76	AA	AA	
実施例 3 (3)	(B1-15)	45	75	AA	AA	
実施例 4 (4)	(B1-1)	42	74	AA	AA	
実施例 5 (5)	(B1-1)	39	72	AA	AA	
実施例 6 (7)	(B1-1)	37	70	AA	AA	
実施例 7 (8)	(B1-2)	45	76	AA	AA	
実施例 8 (9)	(B1-15)	40	72	AA	AA	
実施例 9 (11)	(B1-1)	36	71	AA	AA	
実施例 10 (13)	(B1-2)	41	72	AA	AA	
実施例 11 (14)	(B1-2)	38	69	AA	AA	
実施例 12 (16)	(B1-15)	46	77	AA	AA	
実施例 13 (18)	(B1-1)	41	71	AA	AA	
実施例 14 (23)	(B1-15)	45	76	AA	AA	
実施例 15 (28)	(B2)	44	73	AA	AA	
比較例 1 A	(B1-1)	35	68	AA	BB	
比較例 2 B	(B1-15)	33	66	CC	DD	
比較例 3 C	(B1-2)	35	66	AA	BB	
比較例 4 D	(B1-1)	34	67	AA	CC	
比較例 5 E	(B1-2)	36	68	AA	CC	
比較例 6 F	(B1-1)	37	68	AA	CC	
比較例 7 G	(B1-1)	36	66	AA	BB	
比較例 8 H	(B1-15)	35	64	CC	DD	

[0060] The result of Table 2 shows that the information record medium using the cyanine-dye compound of this invention is excellent in record reproducing characteristics and lightfastness as compared with the example 1 of comparison using the cyanine-dye compound known from the former, or 8.

[0061]

[Effect of the Invention] The effect of outstanding record reproducing characteristics and high lightfastness was acquired by the information record medium of this invention using the cyanine-dye compound which has a chlorine atom on methine carbon, and has a specific organic anion as an opposite anion.

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[Translation done.]